May 30, 2007

M E M O R A N D U M

TO: Mark Mason, P.E.
Engineering Manager, Boise Regional Office

FROM: Steve Ogle, P.E.
Boise Regional Office

SUBJECT: Staff Analysis for Draft Wastewater Reuse Permit LA-000211-01 (Municipal Wastewater)
SunCor Idaho, Inc.

1. PURPOSE

The purpose of this memorandum is to satisfy the requirements of the *Rules for the Reclamation and Reuse of Municipal and Industrial Wastewater* (Rules), IDAPA 58.01.17.400.04, for issuing wastewater reuse permits (WRPs). This memorandum addresses draft WRP No. LA-000211-01, for the private, municipal wastewater treatment and reuse system owned and operated by SunCor Idaho, Inc. (SunCor), for Village 1 of the Avimor Planned Community (APC) project.

2. SUMMARY OF EVENTS

Permit application materials for a Class B municipal wastewater treatment and reuse system for Village 1 of the APC, located north of Eagle, Idaho, were submitted to the Idaho Department of Environmental Quality (DEQ) on September 18, 2006. DEQ issued a comment letter in response to the application materials on December 11, 2006. Additional and revised application materials were received by DEQ on February 16, 2007, and a follow up meeting, to discuss and clarify various aspects of the permit application and the permitting process, was held between representatives from SunCor and DEQ on March 14, 2007.

Plans and specifications for the sewer collection system were approved by DEQ in a letter to SunCor dated October 27, 2006. Subsequent revisions to the sewer plans were approved in letters dated December 1, 2006, and January 17, 2007. The plans and specifications for the wastewater treatment facility were conditionally approved by DEQ on January 9, 2007.

The 2006 WRP application, the 2007 application update/revision, and other supplemental information submitted by the permittee were used to develop draft WRP No. LA-000211-01 for a public review and comment period. After the public review period is closed, DEQ will provide written responses to all relevant comments and prepare a final permit for Avimor's wastewater reuse facilities.

3. SITE AND PROCESS DESCRIPTIONS

The project site for APC is located approximately 10 miles north of Eagle, Idaho, in portions of Ada and Boise Counties. State Highway 55 and Spring Valley Creek run along the western border of the APC site. The APC site consists of a variety of topographical features, from relatively flat, cultivated fields and pasture along Highway 55 to valleys and ridges leading into the foothills to the east. This site generally slopes toward the main channel of Spring Valley Creek, which flows south through the property. The site was previously occupied by Spring Valley Ranch, a cattle ranching operation.

3.1 Soils Evaluation

The Village 1 development is located in Spring Valley along the east side of Highway 55. The WRP application indicates that soils on the Village 1 site consist of Brett-Ladd loams, Goose Creek loams, and Quincy-Brett Complex, with the dominate soil type along Spring Valley Creek being Goose Creek Loam extending to depths between 9 and 60 inches. The Spring Valley subsurface consists of a sequence of course sands and fine-grained mudstones with rhyolite tuff interbeds. Spring Valley is surrounded to the north and south by granite horsts of the Atlanta lobe of the Idaho Batholith. The application also indicates that the primary land use has been for agricultural purposes, including dryland cattle grazing and some irrigated farming of alfalfa hay.

The WRP application indicates that the site proposed for the rapid infiltration (RI) basin, discussed further in Sections 3.4 and 3.5 of this document, is underlain by the Pierce Park Sand member of the Quaternary/Tertiary-age Idaho Group. Pierce Park Sand is composed of course, well-sorted sand with silty and clayey sand interbeds; onsite borings near the center of the proposed RI basin location indicate that sand and silty-clayey sand are continuous to approximately 84 feet below ground surface.

DEQ notes that the WRP application does not include any site-specific analytical soil data for the agricultural reuse areas proposed for slow rate land application; however, the WRP will require SunCor to collect analytical soils data once per year from agricultural sites receiving reclaimed wastewater. Given the similarity in previous and planned future uses of the site (i.e., refer to Section 3.3 of this document), this should be sufficient to establish adequate soil characterizations and ensure proper oversight of the affected areas.

3.2 Surface Water Evaluation

The APC site is generally located along the main channel of Spring Valley Creek in the lower portion of the Spring Valley Creek watershed basin. The WRP application indicates that approximately 90 percent of the watershed basin develops within or upstream of the APC site. The major drainage channels include the main channel of Spring Valley Creek, running north to south along the western boundary of the site, and the North Fork of Spring Valley Creek, which runs across the APC site from east to west where it drains into the main channel of Spring Valley Creek. A third, ephemeral tributary is also located south of the North Fork of Spring Valley Creek, running roughly parallel to the North Fork channel and also draining into the main channel on the western side of the APC site. Flows in Spring Valley Creek and its tributaries vary seasonally with spring runoff events, with lowest flows occurring in late summer and fall. South of the APC property boundary, Spring Valley Creek drains into Dry Creek, which eventually drains into the Boise River. The 2007 WRP application update/revision indicates that the section of Spring Valley Creek located on the APC site has been used for agricultural irrigation and/or

watering livestock.

Spring Valley Creek and its tributaries on the APC site are currently nondesignated surface waters, in accordance with IDAPA 58.01.02.101.01, and have presumed beneficial uses of cold water aquatic life and primary or secondary contact recreation.

3.3 Ground Water Evaluation

SunCor's WRP application identifies two significant ground water regions beneath the APC site: a shallow aquifer beneath the floor of Spring Valley (i.e., the 'Spring Valley Aquifer') and a deeper aquifer located under the upland areas to the east of Spring Valley. The relationship between these two aquifers is not well characterized in the application materials, and very little information is presented for the deeper aquifer to the east. The application does identify and discuss a third aquifer located immediately to the west of Spring Valley, referred to as the Sandy Hill Aquifer.

Water table elevation data was collected from six to nine monitoring wells in June and August of 2006, and used to develop potentiometic surface maps for the Village 1 area and the RI basin location. Monitoring Well Nos. 1-6 were generally spread across the floor of Spring Valley, and boring logs from these wells indicate that ground water generally occurred from 6 to 18 feet below ground surface (bgs) in April of 2006. Monitoring Well Nos. 7-9 were installed in the immediate vicinity of the RI basin location in August of 2006; ground water depths reported in the boring logs indicate a range of depths (i.e., 13 to 90 feet bgs), which may be indicative of discontinuous and/or perched layers. Ground water flow is generally consistent with the topography of the area (i.e., from northeast to southwest), with Spring Valley Creek acting as a drain for the local ground water system. Ground water from beneath Spring Valley has typically been used for irrigation purposes in the past, and the aquifer is currently classified as a general resource aquifer in accordance with IDAPA 58.01.11.300.

The WRP application identifies a northwest-trending granodiorite rock mass to the south of Spring Valley. The application asserts that this rock mass is a low-permeability unit and effectively isolates ground waters in the Spring Valley and Sandy Hill Aquifers from other regional aquifers located to the south. Although the degree of this isolation is somewhat uncertain at the present time, the general characterization appears to have some merit, as the Spring Valley water table is approximately 500 feet higher than the water table in Dry Creek Valley.

The WRP provides a summary of some limited ground water quality data that was collected from Monitoring Well Nos. 1-6 in June 2006. No analytical laboratory report data is presented in the application; however, summary data appears to indicate that relatively low levels of nitrate+nitrite (i.e., 0.06 to 0.84 mg/L) and total phosphorous (i.e., 0.25 to 2.8 mg/L) are present in the Spring Valley Aquifer. Total dissolved solids (TDS) concentrations vary with proximity to surface water drainages, which may be indicative of the previous agricultural activities that occurred in this area, with an average TDS concentration of 265 mg/L reported from wells across the floor of the Spring Valley Aquifer, and an average concentration of 573 mg/L reported from wells located near Spring Valley Creek.

3.4 Process Description

Wastewater generated by Village 1 of the APC (i.e., also referred to as Phase 1 of the development in the WRP application materials) will be collected in a gravity sewer system and conveyed to an influent pump station, which will pump the raw wastewater to the wastewater treatment facility. The wastewater treatment facility is also referred to as the Avimor Water Reclamation Facility (AWRF) in the WRP application materials. The AWRF will be constructed in three equal hydraulic phases, with an ultimate buildout average daily flow capacity of 1 million gallons per day (MGD) and a maximum capacity of 2.0 MGD. The first phase of AWRF will have an average daily flow capacity of 0.3 MGD, and is projected to approach capacity in 2011, near the end of the WRP cycle (i.e., the WRP will have a five-year life).

Influent to AWRF will be measured by a magnetic meter downstream of the influent pump station. Primary treatment, consisting of a three millimeter circular drum screen, will occur prior to discharging the wastewater to an equalization basin. Screenings from the primary treatment process are to be sent to the Hidden Hollow Landfill in Ada County, and effluent from the equalization basin will be sent to secondary and tertiary treatment trains, consisting of conventional activated sludge with biological nutrient removal, chemical phosphorous reduction, and membrane solids separation. Effluent from the membrane bioreactor (MBR) process will then be disinfected with chlorination; the required contact time will be achieved by use of a chlorination pipe length and tank. Disinfected water from the chlorination tank will be pumped to either a RI basin system or designated reuse areas for irrigation purposes (discussed further in the next paragraphs of this section). Solids from the activated sludge process will be automatically removed on a daily basis and sent to an aerated sludge holding tank with approximately five days of storage at full buildout flowrates. Solids from the sludge holding tank will be thickened by use of polymer addition and a gravity belt thickener. Thickened solids will then be hauled offsite by septage haulers for ultimate disposal at the Simco Road Landfill in Ada County or a local publicly owned treatment works (e.g., the West Boise Treatment Plant).

At the present time, SunCor is pursuing two alternative disposal options for treated effluent from the AWRF. One alternative is reuse and rapid infiltration under a WRP from the State of Idaho. This alternative is further discussed in the following paragraph of this section. The second alternative is a direct discharge to Spring Valley Creek under a National Pollution Discharge Elimination System (NPDES) permit from the U.S. Environmental Protection Agency (EPA). SunCor has indicated that an NPDES permit application has been submitted to EPA Region 10, and that EPA has indicated a six-month to two-year timeframe will likely be required to facilitate permit development and issuance. It should be noted that the remainder of this document will focus solely on the reuse and infiltration alternatives, and assumes that all reclaimed wastewater will be addressed under the terms of a WRP (i.e., this analysis does not address the NPDES permit).

During the growing season, the WRP application asserts that treated effluent will be reused to the extent practical for landscape irrigation at agronomic rates, with the remaining balance going to the RI basin and/or designated agricultural reuse areas for slow rate land application. During the non-growing season, the WRP application indicates that treated effluent will primarily be directed to the RI basin.

It must be noted that the 2006 WRP application materials indicate some interest in applying treated effluent to the agricultural areas during the non-growing season; however, the cover letter for the 2007 WRP application update/revision indicates that SunCor is only seeking permit approval for growing season application on these areas at the present time. Similarly, it must be noted that, although the application materials have indicated an active interest in landscape irrigation with the treated effluent, SunCor has not provided enough detail with regard to the proposed landscape irrigation areas, and these areas were not included in the permit at this time (i.e., refer to Sections 3.5 and 4.1.1 for further discussion regarding this issue). Finally, although the WRP application materials also indicate an interest in the use of treated effluent for riparian restoration areas, this reuse method would likely need to be addressed in conjunction with an NPDES permit from EPA, and is not included in the current WRP project.

3.5 Wastewater Evaluation

As previously indicated, the first phase of the AWRF (i.e., Village 1) will have an average daily flow capacity of 0.3 MGD, and is projected to approach buildout capacity near the end of 2011. The estimated flow projection at buildout is based on 1040 equivalent dwelling units (EDUs), including commercial developments, discharging at an average rate of 300 gallons per day per EDU (i.e., 312,000 gallons per day). Peak hour flow for the first phase of AWRF has been estimated at 1.16 MGD, based on the average daily projection of 0.3 MGD. Actual flow data will be collected during operation the first phase of AWRF to aid in future planning and flow projections for subsequent phases of the AWRF.

The WRP application materials also present constituent loading rate projections for influent to the AWRF; however, the projections are only estimates based on "typical characteristics for residential wastewater", and have not been reproduced in this document. Refer to Section 6 of the Engineering Report, contained as Attachment C of the 2007 WRP application update/revision for further discussions regarding influent loading rates.

As indicated in the previous section of this document, the method of AWRF effluent reuse will vary seasonally and daily, depending on availability and demand. Growing season applications proposed in the WRP application include landscape irrigation of common areas within the development and slow rate land application on designated agriculture areas, with any remaining balance going into the RI basin; however, it must be noted that the WRP application materials submitted to DEQ do not contain enough detail with regard to the proposed landscape irrigation areas (e.g., identification of discrete areas for delineation as Hydraulic Management Units within the permit, consideration of buffer zone requirements, etc.). Consequently, these areas have not been permitted at the present time. In the event that SunCor elects to compile this information for inclusion into the permit, DEQ will modify the permit to include these areas at a later date. At the present time, non-growing season applications will be limited to the RI basin.

On March 14, 2007, SunCor provided a ground water impact assessment for nitrate that will be present in AWRF effluent discharged to the RI system. This assessment assumed a nitrate concentration of 8.0 milligrams per liter (mg/L) or less in AWRF effluent, and indicates that the system is expected to comply with the ground water standard for nitrate on an annual basis at the site boundary. The point of compliance with respect to the ground water nitrate standard is the location where groundwater flows off of the APC property boundary. For this site, it was

assumed that all ground water drains to Spring Valley Creek, and the point where Spring Valley Creek exits the APC property boundary was used as the point of compliance.

DEQ notes that the impact assessment includes a number of conservative assumptions, such as no denitrification in the RI system and no assimilation of nitrate by aquatic or riparian uptake in surface waters (i.e., the assessment does appear to present a 'worst-case' scenario in certain regards); however, there are also several uncertainties associated with the bases and methodologies used in this assessment, including the use of dated flow information for Spring Valley Creek and the use of half of the projected design discharge rate for the RI system. Moreover, DEQ notes that the greater uncertainties regarding actual buildout/wastewater generation rates (i.e., with respect to the projected rates used for purposes of the 5-year permit life) severely limit the practical application aspects of any impact assessment for this site, as the actual flowrates to the reuse systems during the 5-year permit term are generally expected to be much lower than projected values used for SunCor's assessment. Consequently, the assessment provides only limited insight into possible impacts that could be associated with operation of the RI system; however, DEQ has accepted this analysis for purposes of initial permit development. It must be noted that, as the APC is developed over time, SunCor will be required to monitor this site for potential impacts from the reuse facilities, and may be required to conduct additional or refined impact assessments to address or mitigate any such issues as they arise. Similarly, DEQ may require additional requirements within the permit if monitoring data indicates adverse impacts resulting from the reuse operations.

During the March 14th meeting, representatives from SunCor and DEQ also discussed the level of phosphorous reduction that would be required in AWRF effluent discharged to the RI system. Although several approaches/options were discussed, SunCor ultimately agreed to reduce phosphorous concentrations in effluent discharged to the RI system to the same level that would likely be required by EPA under the NPDES permit for a direct discharge to surface waters. This approach simplifies the permitting process by addressing/mitigating concerns that phosphorous discharged to ground water through the RI basin may eventually re-appear in down gradient surface water bodies (i.e., this assessment presents a 'worst-case' scenario with respect to phosphorous). Discussions with EPA indicate that any phosphorous limit contained in a NPDES permit would likely be based on the phosphorous allocation contained in the Phosphorous Total Maximum Daily Load (TMDL) for the Lower Boise River. This document is presently in draft version, pending approval and development of a final document by EPA and DEQ. SunCor will ultimately be required to conform with the phosphorous allocation mandated in the final version TMDL document.

Table 3.1 contains constituent criteria and performance parameters for treated effluent from AWRF, based upon proposed seasonal uses. The basis for nitrogen and phosphorous discharge levels were discussed in the preceding paragraphs; discharge requirements for turbidity and total coliform are based on the Class B requirements contained in the Rules (i.e., refer to IDAPA 58.01.17.600.07.b and .08). Other discharge parameters are design performance standards taken from Section 6 of the Engineering Report, contained as Attachment C of the 2007 WRP application update/revision.

TABLE 3.1: Effluent Criteria for the Avimor Water Reclamation Facility

Constituent	Effluent Parameters	
	Growing Season	Non-growing Season
Biochemical Oxygen Demand	≤5.0 mg/L	≤5.0 mg/L
Total Suspended Solids	≤5.0 mg/L	≤5.0 mg/L
Total Nitrogen	≤8.0 mg/L	≤8.0 mg/L
Total Phosphorous	≤8.0 mg/L (≤0.1 mg/L for RI basin[a, b])	≤0.1 mg/L[b]
Turbidity	≤2.0 NTU	≤2.0 NTU
Total Coliform	≤2.2 CFU/100mL of effluent	≤2.2 CFU/100mL of effluent

[a]Treated effluent discharged to the RI basin during the growing season must be treated to 0.2 mg/L to ensure surface water protection, due to potential interconnectivity issues associated with the basin, ground water, and surface water.
[b]The phosphorous concentration presented in this table (i.e., ≤0.1 mg/L) represents the effluent reduction level designed for the wastewater treatment facility. Phosphorous limits for effluent discharged from AWRF to the RI basin will ultimately be required to conform to the final version of the Lower Boise River Phosphorous TMDL.

4. REGULATORY DISCUSSION

This section discusses regulatory and technical basis for terms and conditions contained in the draft version of WRP No. LA-000211-01. Administrative changes and/or similar, non-technical aspects of the draft permit (e.g., Sections A-D, I, and J of the permit) are not specifically addressed within this document.

4.1 Site-Specific Permit Conditions – Section F

Section F of the WRP contains site-specific permit requirements for the wastewater treatment and reuse systems. These requirements are broken out into two tables. The first table contains two sets of limits that are system-dependent (i.e., the table contains a specific set of requirements that apply to the agricultural systems, and a second set of requirements that only apply to the RI system). A second table contains requirements that are mutual to the entire operation, regardless of which site receives the treated wastewater.

4.1.1 Application Season Restriction

Section F of the WRP restricts any application of treated wastewater on the agricultural sites to the growing season (GS). The GS is defined as the period from May 1st through October 31st of each year; refer to the definition in Section C of the WRP. Although SunCor has indicated some interest in non-growing season applications on the agricultural sites, this proposal would require additional soil characterization and an assessment of the available water capacities of the onsite soils, which has not currently been submitted to DEQ. Consequently, the WRP presently restricts treated wastewater applications on these sites to the GS.

Additionally, as was indicated previously, SunCor's WRP application materials do not contain enough information for the proposed landscape irrigation areas (e.g., identification of discrete areas for delineation as Hydraulic Management Units within the permit, consideration of buffer zone requirements, etc.). Although DEQ has developed the WRP in a manner that will facilitate inclusion of these areas within the permit at a later date, these areas have not been permitted for wastewater application uses at the present time.

The RI system is permitted for year-round application. Refer to the following section for further discussion regarding application rates to the RI system.

4.1.2 Hydraulic Loading Rate Limit

The permit contains two different hydraulic loading rate limits: one for the agricultural systems, and a second for the RI system.

For the agricultural systems, current WRP guidance typically specifies that the GS hydraulic loading rate (HLR) should substantially approximate the irrigation water requirement (IWR) for crop(s) grown on each hydraulic management unit (HMU). Section E of the WRP specifies the IWR as the GS hydraulic loading rate applicable to each HMU designated for agricultural irrigation. Permitted HMUs are defined in Appendices 1 and 2 of the WRP.

Section C of the permit defines IWR as "[a]ny combination of wastewater and supplemental irrigation water applied at rates commensurate to the moisture requirements of the crop, and calculated monthly during the growing season. Calculation methodology for the IWR can be found at: http://www.kimberly.uidaho.edu/water/appndxet/index.shtml. The equation used to calculate the IWR at this website is:

$$IWR = (CU - P_e) / E_i$$

Where: CU is the monthly consumptive use for a given crop in a given climatic area. CU is synonymous with crop evapotranspiration;
P_e is the effective precipitation. CU minus P_e is synonymous with the mean net irrigation requirement (IR);
E_i is the irrigation system efficiency. To obtain the gross irrigation water requirement (IWR), divide the IR by the irrigation system efficiency."

Hydraulic application rates to each HMU should generally follow the IWR for the specific crop(s) grown throughout the season. It should be noted that any significant deviation from the IWR during the GS should be addressed and explained within the narrative interpretation of the subsequent Annual Report submitted for that season (refer to Reporting Requirement No. 1 in Section H of the permit).

With respect to the RI system, the hydraulic loading rate limit is largely based on the projected, buildout design flowrate of effluent from the AWRF. As previously indicated, the first phase of the AWRF (i.e., Village 1) will have an estimated, average daily flow capacity of 0.3 MGD at buildout. Infiltration capacity assessments provided in SunCor's WRP application materials indicate that the location and area proposed for the RI system will more than accommodate the entire design flowrate. Although DEQ does not currently have design specifications for the RI system (refer to Section 4.4.2 of this document for a discussion regarding plans and specification submittal requirements for the reuse facilities), the WRP indicates that 2 to 3 acres have been allocated for use in the RI system; Section 4.2 of the Preliminary Technical Report, included as Attachment 4 in the 2006 WRP application materials, states that an area of less than 0.3 acres is

needed to infiltrate the design discharge rate of 0.3 MGD. Consequently, the WRP contains an annual hydraulic loading rate limit of 0.3 MGD for the RI system.

4.1.3 Maximum Nitrogen Loading Rate Limit

The WRP establishes a maximum nitrogen loading rate of 150% of typical crop uptake. Typical crop uptake is defined as the median constituent crop uptake from the three most recent years the crop has been grown, and must be determined for each HMU; however, regional crop yield data and typical nutrient content values, or other values approved by DEQ may be used. The nitrogen loading rate limit is the same as that typically recommended in the current WRP guidance (i.e., crop uptake plus 50%, with each year's uptake to be based on the previous 3-year average uptake).

This provision does not apply to the RI system, as the nitrogen loading rate to that system will be regulated by application of a wastewater treatment effluent requirement within the WRP.

4.1.4 Maximum Chemical Oxygen Demand Loading Rate Limit

The typical COD loading rate limit applied in municipal system WRPs issued by the State of Idaho is 50 lbs/acre-day. The COD loading rates for the agricultural sites is expected to be substantially less than this due to the effluent limits required on effluent discharged from the wastewater treatment plant. Consequently, no COD loading rates limits have been included in the permit at this time; however, it should be noted that the permit does require SunCor to monitor COD in effluent applied to agricultural systems and to project annual loading rates to each HMU. This was done to allow DEQ to monitor these systems for any adverse impacts that could occur as the systems are operated over time.

This provision does not apply to the RI system.

4.1.5 Maximum Phosphorous Loading Rate Limit

No phosphorus loading rate limits are included in the permit. In light of the low level of phosphorous removal required at the treatment plant, the phosphorus uptake rate of onsite crops is reasonably expected to prevent any phosphorous issues from occurring onsite; however, a re-opener clause is included in the WRP in the event DEQ determines that this issue must be revisited at a later time. Phosphorus loading rates are usually set by DEQ based upon either ground water or surface water concerns. With respect to ground water concerns, DEQ typically does not set a phosphorus loading limit where there is no direct interconnection between ground water and surface water (i.e. where ground water discharging from the down-gradient boundary of the treatment site does not enter surface water).

This issue does not apply to the RI system, as the phosphorous loading rate is regulated by use of a wastewater treatment effluent requirement.

4.1.5 Wastewater Treatment System Effluent, Biological Oxygen Demand Limit

The WRP stipulates a biological oxygen demand (BOD_5) concentration limit of five mg/L or less

for effluent discharged from the wastewater treatment system. This limit reflects underlying design parameters for the AWRF, as approved for construction by DEQ, and is used as system performance indicator to assess and/or demonstrate that the system is operating as designed. This parameter is critical in assessing the long-term performance of the treatment system and has been included in the WRP to assure that the system is operated as intended.

4.1.6 Wastewater Treatment System Effluent, Total Nitrogen Limit

The WRP stipulates a total nitrogen concentration limit of 8.0 mg/L or less for treatment plant effluent discharged to the RI system. It should be noted that nitrogen content discharged to the agricultural areas is regulated by a use of nitrate loading limit at each site, which allows an accounting for some plant uptake of nitrate (i.e., the effluent concentration limit only applies to wastewaters discharged to the RI system). The total nitrogen concentration limit has been applied to wastewaters discharged to the RI system in an effort to prevent any exceedence of the ground water quality standard for nitrate. SunCor has submitted a ground water impact assessment that indicates a minimal impact to existing ground water quality at the point of compliance, based on design discharge rates and a effluent treatment level for total nitrogen of 8.0 mg/L.

4.1.7 Wastewater Treatment System Effluent, Total Suspended Solids Limit

The permit does not contain any effluent limits for total suspended solids (TSS). The plans and specifications submitted to DEQ for the wastewater treatment plant indicate that SunCor will install in-line turbidity meters which are to be operated at all times; IDAPA 58.01.17.600.07.b stipulates that systems with this type of turbidity monitoring systems are not required to do any additional TSS monitoring. Consequently, no requirements relative to TSS concentrations in the effluent have been included in the WRP. It should be noted that the turbidity requirements and continual monitoring requirements from IDAPA 58.01.17.600.07.b have been included in the permit (i.e., refer to Section 4.1.9 of this document for additional discussion of these requirements).

4.1.8 Wastewater Treatment System Effluent, Total Phosphorous Limit

As indicated previously in this document, SunCor ultimately agreed to reduce phosphorous concentrations in the effluent discharged to the RI system to the same level that would be required by EPA under the NPDES permit for a direct discharge to surface waters. This approach was used in order to mitigate concerns that phosphorous discharged to ground water through the RI basin may re-appear in down gradient surface water bodies (i.e., Spring Valley Creek) and eventually drain into the Boise River. Discussions with EPA indicate that any phosphorous limit contained in a NPDES permit would likely be based on the phosphorous load allocation contained in the Phosphorous Total Maximum Daily Load (TMDL) for the Lower Boise River. This document is presently in draft version, pending approval and development of a final document by EPA and DEQ. SunCor will ultimately be required to meet the phosphorous reduction level mandated in the final version TMDL document (refer to discussion in Section 4.4.5 of this document for further details); however, for the present time, the WRP requires the facility to meet a phosphorous concentration limit of 0.1 mg/L or less for effluent discharged from the wastewater treatment system to the RI system. This limit reflects an underlying phosphorous reduction design parameter for the AWRF.

It must be noted that the phosphorous concentration limit only applies to wastewaters directed to the RI system; wastewaters discharged to the agricultural areas do not presently have any concentration-based standard under the WRP. It is expected that crop uptake will mitigate any potential impacts associated with the phosphorous applied on these sites.

4.1.9 Wastewater Treatment System Effluent, Turbidity Limit

Turbidity requirements for Class B effluent are contained in IDAPA 58.01.17.600.07, and stipulate that turbidity of the effluent must be monitored continuously, with no 24-hour average measurements exceeding 2 Nephelometric Turbidity Units (NTU) and with no instantaneous maximum measurement exceeding 5 NTU. These turbidity requirements are included in the permit for all wastewater effluent discharged from the treatment system.

4.1.10 Wastewater Treatment System Effluent discharged from Chlorination Tank, Total Coliform Limit and Chlorine Residual

Disinfection requirements for Class B effluent are contained in IDAPA 58.01.17.600.07, and stipulate that at the point of compliance, the median number of coliform organisms cannot exceed 2.2 total coliform units per 100 milliliters of effluent (TCU/100 mL) as determined from the bacteriological results of the last seven days for which analyses have been completed, and also cannot exceed 23 TCU/100 mL in any confirmed sample. Additionally, the Rules specify a residual chlorine concentration at the point of compliance equal or comparable to the disinfection achieved by chlorination with 1 mg/L after 30 minutes of contact time. These disinfection requirements are included in the permit for all wastewater effluent discharged from the treatment system.

4.1.11 Runoff and Wellhead Protection Requirements

Section F of the permit generally requires the permittee to manage the reuse sites in accordance with an approved Runoff Management Plan, required by Compliance Activity No. CA-210-04. To prevent runoff from the reuse sites, Best Management Practices (BMPs) will be used around all areas where runoff may potentially occur. Additionally, berms and other BMPs will be used to protect the wellhead of on-site wells. New BMPs shall be reviewed and approved by DEQ prior to implementation.

4.1.12 Buffer Zones Requirements

Given the disinfection and residual chlorination requirements at the point of compliance for this system, the following buffer zone distances have been specified in the permit:

Public Access Areas: 0 feet

Surface Water: 50 feet (mitigation measures to prevent runoff to surface waters shall be employed)

Inhabited Dwellings: 100 feet

Irrigation Water Wells: 100 feet

Domestic Water Wells: 500 feet

Municipal Water Wells: Site specific (requires DEQ plan and specifications review prior to construction)

4.1.13 Posting Requirement

In order to prevent accidental or unintentional human exposure to wastewater, the permit requires signs to be posted around each HMU and the RI system. The signs are required to state "Irrigated with Reclaimed Wastewater – Do Not Drink", or equivalent. Additionally, the WRP requires fencing around the perimeter of the RI system site to prevent any unintentional access to the site.

4.1.14 Irrigation Scheduling Requirement

In accordance with IDAPA 58.01.17.600.07, Class B effluent can only be applied during periods of non-use by the public. Consequently, the WRP stipulates that irrigation only be allowed during periods of non-use by the public (i.e., times when the agricultural areas will not be accessed). This provision has not been applied to the RI system, as the public should not generally be allowed access to these facilities under normal circumstances.

4.1.15 Crop Management and Grazing Requirements

The WRP requires that grass clippings generated during mowing events for landscape areas, or similar field maintenance activities, shall be immediately collected and removed from each HMU. This permit requirement is intended to prevent nitrogen and phosphorous contained in the clippings from leaching back into the subsurface/increasing the constituent load to ground water at these sites.

The WRP also requires submittal of a Grazing Management Plan for agricultural areas, to be reviewed and approved by DEQ prior to initiation of any grazing activities onsite. DEQ has inserted this permit provision to allow ongoing regulatory oversight of any future modifications to the reuse system and associated operations.

These provisions do not apply to the RI system, as crops are not grown onsite at these facilities.

4.1.16 Wastewater Treatment and Reuse System Operation Requirement

Section F of the permit requires the wastewater treatment and reuse systems to be operated by personnel certified and licensed in the State of Idaho wastewater operator training program at the operator class level specified in IDAPA 58.01.16.203 of the *Wastewater Rules*, and properly trained to operate and maintain the system. Operation of the wastewater treatment system must be monitored on a 24-hour basis for alarm conditions, including notification of the qualified operating personnel under alarm conditions.

4.1.17 Ground Water Quality Restriction

The permit requires that wastewater reuse activities conducted by the permittee shall not cause a violation of the *Ground Water Quality Rule*, IDAPA 58.01.11. This permit condition is intended

to ensure that the facility's wastewater reuse operations comply with the *Ground Water Quality Rule*.

4.1.18 Odor Management Requirements

Section F of the permit contains a provision stating that land application facilities and other operations associated with the facility shall not create a public health hazard or nuisance conditions including odors.

DEQ notes that Compliance Activity No. CA-211-01 requires the Plan of Operation to include specific design considerations, operation and maintenance procedures, and management practices to be employed to minimize the potential for or limit odors. The plan shall also include procedures to respond to an odor incident if one occurs, including notification procedures. This provision should be sufficient to prevent or mitigate any odors associated with the wastewater treatment and reuse facilities.

4.1.19 Supplemental Irrigation Water Protection Requirement

This requirement mandates installation of a DEQ-approved backflow prevention device, where fresh and wastewater interconnections exist in the reuse systems, to prevent contamination of the fresh irrigation water source (i.e., ground or surface waters, in this case). This is intended to assist with ongoing regulatory oversight of the reuse system and/or associated operations.

4.1.20 Construction Plans Requirement

The WRP requires SunCor to submit plans and specification for DEQ review and approval, prior to construction or modification of any wastewater facilities associated with the reuse system. This is intended to allow ongoing regulatory oversight of any future modifications to the wastewater treatment and/or reuse facilities.

4.2 Monitoring Requirements – Section G

The monitoring provisions needed to assess and/or establish ongoing compliance with site-specific permit requirements are given in the following sections of this memorandum. The monitoring requirements contained within Section G of the permit are broken out into two tables. The first table contains monitoring requirements that apply to the agricultural systems, while a second table contains monitoring requirements that only apply to the RI system.

4.2.1 Sewer Influent – Volumetric Flowrate and Constituent Sampling

As was discussed in Section 3.5 of this document, the design parameters for the wastewater treatment and reuse facilities were largely estimated projections, and additional uncertainties exist regarding buildout timeframes for Village 1. Consequently, the permit requires SunCor to monitor and record the sewage influent rate to the treatment system. The monitoring point is the flow meter at the influent pump station to AWRF. The permit also requires SunCor to collect a 24-hour composite sample for BOD_5 once a month from the equalization basin. These requirements appear in both monitoring tables in Section G of the permit.

4.2.2 Membrane Bioreactor Effluent – Turbidity

Section 4.1.9 of this document discusses the turbidity requirements of the WRP. To assess compliance with this provision, the WRP requires that SunCor monitor the MBR effluent for turbidity on a continual basis with an inline meter. The turbidity is to be recorded on an instantaneous and 24-hour averaging basis. This requirement appears in both monitoring tables in Section G of the permit.

4.2.3 Supplemental Irrigation – Volumetric Flowrate

Although the WRP application materials indicate that no supplemental irrigation will be required, the uncertainties regarding buildout rate (i.e., and the subsequent wastewater generation rate) may require the use of such irrigation water to meet the IWR requirement of the crop on each HMU. In the event that irrigation water is required, the hydraulic loading rate limit requirement stipulates that such flowrates to each HMU be included in the total hydraulic load; therefore the WRP requires that this parameter be recorded on a daily basis for each HMU when in use. This requirement only applies to/appears in the Agricultural Systems Monitoring Table in Section G of the permit.

4.2.4 Wastewater Treatment Facility Effluent – Volumetric Flowrate and Constituent Sampling

The permit requires that SunCor monitor and record the volumetric flowrates to each HMU and to the RI system on a daily basis. The permit also requires that a grab sample for total coliform be collected on a daily basis, when reclaimed wastewater is applied to any HMU or the RI system, while a 24-hour composite sample must be collected on a monthly basis for BOD_5, chemical oxygen demand (COD), total Kjeldahl nitrogen, nitrate-nitrogen, ammonia, total phosphorus, and free chlorine residual analyses. The monitoring point for these requirements is the reuse pump station flow meter and sampler. These parameters will be used to assess hydraulic loading rates, as well as constituent loading rates and/or concentration limits, for each HMU. Refer to Sections 4.1.2 through 4.1.10 of this document for discussions regarding these permit requirements. These monitoring requirements appear in both monitoring tables in Section G of the permit.

4.2.5 Ground Water – Constituent Sampling

As was discussed in Section 3.5 of this document, SunCor conducted a ground water impact assessment for the nitrate that will be present in AWRF effluent discharged into the RI basin. This assessment relied heavily upon multiple assumptions and has some degree of uncertainty. To ensure oversight of any impacts to ground water, the permit requires that SunCor collect samples from a ground water monitoring network. This network will be formalized in accordance with Compliance Activity No. CA-211-03 of the permit, and should allow DEQ to assess any impacts resulting from the reuse facilities, especially the RI system. The permit requires collection of samples twice a year, and analyses for total coliform, total Kjeldahl nitrogen, nitrate-nitrogen, ammonia, total phosphorous, TDS, chloride, water table elevation, and water table depth. These monitoring requirements appear in both monitoring tables in Section G of the permit.

4.2.6 Surface Water – Constituent Sampling

As was discussed in Section 3.3 of this document, ground water in the shallow aquifer beneath Spring Valley is generally thought to drain into Spring Valley Creek. Constituents loaded to ground water may therefore appear, to some degree, in the creek. To ensure oversight of any impacts to surface water, the permit requires that SunCor collect samples from a surface water monitoring network. This network will be formalized in accordance with Compliance Activity No. CA-211-03 of the permit, and should allow DEQ to assess any impacts resulting from the reuse facilities, especially the RI system. The permit requires collection of samples twice a year, and analysis for ammonia, nitrate+nitrite, total Kjeldahl nitrogen, total phosphorous, dissolved orthophosphorous, and chloride. This monitoring requirement has only been applied to the RI System Monitoring Table, as surface water impacts resulting from agricultural systems are generally expected to be minimal.

4.2.7 Irrigation Water Requirement – Calculation

The permit requires that SunCor calculate the IWR for each crop type on each HMU, and on a monthly basis. This provision was implemented in an effort to ensure that proper crop management techniques are used on the agricultural HMUs. This requirement only applies to/appears in the Agricultural Systems Monitoring Table.

4.2.8 Reclaimed Wastewater Application Areas – Acreage

The WRP requires SunCor to monitor and report the actual acreage used for the reuse of reclaimed wastewater each year. In the event that only a portion of an HMU is used, SunCor must submit a site plan showing areas used within the HMU and quantify the acreage. This requirement is intended to address uncertainties regarding the availability of reclaimed water relative to the total amount of permitted acreage, and only applies to/appears in the Agricultural Systems Monitoring Table.

4.2.9 Reclaimed Water Loading Rates – Constituent Loading, Crop Uptake, and Soil Sampling

For agricultural system HMUs, the permit stipulates a nitrogen loading rate limit relative to crop uptake. The loading rates of total phosphorous and COD are also of concern in a municipal wastewater setting, although no loading rate limits have been set for these sites at the present time. Refer to Sections 4.1.3 through 4.1.5 of this document for further discussion.

To ensure proper regulatory oversight of these parameters, the WRP requires SunCor to calculate and report the total nitrogen, total phosphorus, and COD loading rate to each HMU from all reclaimed wastewater and fertilizer applications each year. The permit also requires SunCor to estimate the annual crop uptake rate for nitrogen and phosphorous. Finally, the permit requires annual collection of soil samples from each agricultural system HMU in accordance with Condition No. 5 in Section G of the permit, with analyses for electrical conductivity, nitrate-nitrogen, ammonium nitrogen, pH, and plant available phosphorous. The soil monitoring has been required to assess the long-term effects of land application of these HMUs. These requirements only apply to/appear in the Agricultural Systems Monitoring Table.

4.2.10 Reclaimed Waster Loading Rates – Rapid Infiltration Cell Usage

Section 4.4.2 of this document discusses Compliance Activity No. CA-211-02, which requires submittal of plans and specifications for all reuse facilities prior to construction. These design documents have not been submitted to DEQ at the present time; however, it is anticipated that the RI system will be designed in a manner that allows each cell to be dosed with reclaimed water independently of the other basins. This would allow some basins to be operated actively while other basins could be taken out of use (e.g., for maintenance). Consequently, the WRP requires that SunCor monitor the date(s) of usage for each infiltration cell in the RI system when used for disposal of reclaimed wastewater. This monitoring requirement has only been applied to the RI System Monitoring Table.

4.2.11 Supplemental Irrigation Water - Backflow Prevention Device Testing

This condition requires SunCor to test all backflow prevention devices for all supplemental irrigation pumps directly connected to the wastewater distribution system. The testing date(s) and results of the test are parameters to be monitored and reported. If any test fails, the date of repair or replacement of the backflow prevention device, as well as a retest of the repaired/replaced device is required. This monitoring requirement only appears in the Agricultural Systems Monitoring Table (i.e., as the RI system will not require supplemental irrigation water), and is ultimately intended to protect ground/surface water quality at the site.

4.2.12 Flowrates – Meter/Device Calibration

The WRP contains monitoring provisions that require SunCor to document bi-annual calibration of all flow meters and pumps used to directly or indirectly measure all wastewater and irrigation water flows applied to each HMU. This monitoring requirement appears in both monitoring tables in Section G of the permit, and has been included to ensure accuracy in the monitoring data reported to DEQ.

4.3 Reporting Requirements – Section H

Section H of the permit contains the Annual Report requirements for the land application sites. Essentially, the Annual Report should contain results from all work conducted during the previous annual period for each monitoring requirement listed in Section F of the permit. This section also contains reporting requirements for all compliance activities contained in the permit.

4.4 Compliance Schedule for Required Activities – Section E

The following compliance activities have been implemented within the draft WRP in order to address various regulatory issues and/or update permit materials to reflect the current status of facility operations.

4.4.1 Plan of Operation

DEQ notes that SunCor's application materials only contains an outline of the Plan of Operation; refer to Attachment 5 of the 2006 WRP application. The APC wastewater treatment and reuse

systems constitute new facilities, and will require a detailed Plan of Operation at the 50% completion point of construction (i.e., refer to IDAPA 58.01.17.300.07). Additionally, the Plan must be updated after one year of operation, to reflect actual operating procedures. Consequently, this requirement has been included in the WRP as Compliance Activity No. CA-211-01. Upon receiving DEQ's approval, the Plan of Operation will be incorporated into the terms and conditions of the renewal permit, and will be enforceable as such (refer to Section B of the permit).

The Plan of Operation must generally incorporate the requirements of the permit, and should be designed for use as an operator guide for actual day-to-day operations required to meet these permit requirements. The plan must also include sampling and monitoring as required by the permit. The Plan of Operation is specifically required to include or address:

Operating procedures for periods of shutdown and low flows to the wastewater treatment and reuse system;

A description of approved sample collection methods, appropriate analytical methods, and companion QA/QC protocols;

Specific design considerations, operation and maintenance procedures, and management practices to be employed to minimize the potential for or limit odors.

4.4.2 Plans and Specifications for Reuse Systems

Compliance Activity No. CA-211-02 requires submittal of plans and specifications for the proposed reuse systems prior to application of any wastewater. In this context, the term 'reuse systems' includes the rapid infiltration system, common area irrigation system(s), and the slow rate land application systems. DEQ notes that engineering plans and specifications for the components of the rapid infiltration and slow rate land application systems have not been submitted at the present time. Although plans and specifications for some common area pressure irrigation systems have been submitted and approved by DEQ, it is currently unclear if these approved plans will account for buffer zones and/or similar requirements that will be imposed through the WRP; consequently, SunCor may need to revise or expand the currently approved plans to facilitate applicable WRP requirements.

4.4.3 Plans for a Ground Water and Surface Water Monitoring System

Prior to application of reuse water onsite, SunCor must submit plans and specifications for a ground water and a surface water monitoring network to DEQ for review and approval. As discussed previously in this document, ground water impact assessments conducted by SunCor indicate that the proposed reuse activities are unlikely to adversely impact the shallow aquifer; however, given the uncertainties associated with these projections, a ground water monitoring network is required to gauge the long-term quality of ground water quality at this site, as well as any impacts caused by reuse activities. Since the shallow aquifer in Spring Valley appears to be interconnected with Spring Valley Creek, DEQ is also requiring a surface water monitoring network to assess any impacts that may appear in the surface waters crossing/adjacent to the site. The compliance activity requires that complete screening depth information, or proposals for wells that have yet to be installed, drilling logs, and spatial coordinates be provided for all completed wells identified as part of the groundwater monitoring network.

4.4.3 Runoff Management Plan

Compliance Activity No. CA-210-04 in Section E of the permit requires submittal of a Runoff Management Plan designed to prevent any runoff from any site or field used for wastewater reuse to any property not owned by SunCor, except after a 25-year, 24-hour storm event or greater. This storm event is to be defined by use of the Western Regional Climate Center (WRCC) Precipitation Frequency Map, Figure 28 "Isopluvials of a 25-YR, 24-HR Precipitation". For the APC site, the 25-year, 24-hour event is 2.2 inches.

4.4.4 Scaled Site Map

Compliance Activity No. CA-211-05 specifically requires submittal of a scaled site map delineating buffer zones, homes, public access areas, wells, streams/canals, berms or other relevant BMPs constructed in conjunction the Runoff Management Plan, and the actual locations and areas in acres of the constructed RI basin and each HMU within 60 days after completion of construction of the reuse facilities. This activity is intended to ensure submittal of accurate record drawings for the wastewater treatment and reuse facilities.

4.4.5 Phosphorous Limit for Wastewater Treatment System Effluent Discharged to RI System

As previously discussed, treated effluent discharged to the RI basin will need to conform with the phosphorous load allocation contained in the final Phosphorous TMDL for the Lower Boise River. This document is presently in draft version, pending approval and development of a final document by EPA and DEQ. Compliance Activity No. CA-211-06 requires SunCor to submit a proposal for managing effluent discharged to the RI system in light of the load allocation contained in the final TMDL. Upon review of this proposal, DEQ will modify the WRP as needed to incorporate the proposal in a manner that will satisfy the requirements of the TMDL.

4.4.6 Waste Solids Management Plan

Provision No. 5 in Section I of the permit generally requires that management of waste solids is to be governed by the terms of a DEQ-approved waste solids management plan. Compliance Activity No. CA-211-07 requires submittal of this plan prior to any application or disposal of waste solids from the treatment or reuse facilities

4.4.7 Renewal Permit Application

Compliance Activity No. CA-211-08 in the permit requires SunCor to submit a permit application renewal package within six months of the permit's expiration date (i.e., to be documented in Section A of the permit upon final issuance).

5. RECOMMENDATIONS

Based on review of applicable state rules, staff recommends that DEQ issue draft WRP No. LA-000211-01 for a public review and comment period. The draft permit contains effluent quality requirements for the wastewater treatment system, as well as terms and conditions required for operation of the rapid

infiltration and reuse systems. Monitoring and reporting requirements to evaluate system performance and to determine permit compliance have been specified, and compliance activities recommended in the staff analysis have been incorporated into Section E of the permit.